Date: Sat, 20 Aug 94 04:30:11 PDT
From: Ham-Ant Mailing List and Newsgroup <ham-ant@ucsd.edu>
Errors-To: Ham-Ant-Errors@UCSD.Edu
Reply-To: Ham-Ant@UCSD.Edu
Precedence: Bulk
Subject: Ham-Ant Digest V94 #272
To: Ham-Ant

Ham-Ant Digest Sat, 20 Aug 94 Volume 94 : Issue 272

Today's Topics:
Does 73 Magazine have high SWR?
Should feedline length change the VSWR?

Send Replies or notes for publication to: <Ham-Ant@UCSD.Edu>
Send subscription requests to: <Ham-Ant-REQUEST@UCSD.Edu>
Problems you can't solve otherwise to brian@ucsd.edu.

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Date: 19 Aug 1994 15:20:19 GMT
From: ihnp4.ucsd.edu!mvb.saic.com!unogate!news.service.uci.edu!usc!cs.utexas.edu!
howland.reston.ans.net!noc.near.net!hopscotch.ksr.com!jfw@network.ucsd.edu
Subject: Does 73 Magazine have high SWR?
To: ham-ant@ucsd.edu

ab4el@jabba.cybernetics.net (Stephen Modena) writes:
>In article <32u8vi$2gl@tekadm1.cse.tek.com>,
>Roy W Lewallen <royle@tekgp4.cse.tek.com> wrote:
>>I do have to add a loud cautionary note, though. Particularly in amateur
>>publications, a lot of the "authoritative" information is misapplied or
>>just plain wrong.

>No sooner said and my issue of 73 Magazine arrives with this following
>eyesore jumping out of the pages at me....excerpted without permission.
>Technical errors and bad advice abound: post your critique!

Make up your mind; first you tell us that the feedline must be a
half-wavelength, now you criticize an author in 73 Magazine for saying
the same.

I'll leave the silly mistakes alone and try to figure out whether the
article was a waste of time or not.

>-------------Cut Here----------------
>   [This following excerpt is copyrighted by Wayne Green Inc.]
>_Low-Cost Transmission Lines: What you don't know can cost you_
>by Frank Kamp K5DKZ
>73 Amateur Radio Today: 408 Sept. 1994
>page 22
>"....
>"THE PROCEDURE
>"The key here is to ensure that the nondescript line is equal to
>a multiple of _electrical_ half waves in length. The down side
>is that this trick will only work on exact multiples of a fundamental
>frequency.

I don't read 73 Magazine (for what are probably obvious reasons), but
you have left out the part of this that would determine whether this is
misguided but accurate advice, or a load of crap.

If the author is saying "take a resonant 50-ohm antenna, use exactly a
half-wavelength of random 66.6-ohm coax from Back Of The Truck, Inc.,
and it will present a 50-ohm load to your ricebox and might even manage
to radiate", then the article is correct (and points out that the trick
is narrowbanded in nature), assuming it warns that the SWR on the random
feedline is potentially high. Because there are *two* feedlines here,
of different characteristic impedances, sure enough, changing the length
of the second feedline changes the SWR on the first. Note that in my
first article on this subject <32nufo$qec@hopscotch.ksr.com>, there was
an explicit assumption that there was only one coax.

If the author claims that this procedure results in a 1:1 SWR

         on the "nondescript" feedline

then the author is dead wrong (even if the SWR meter says 1:1!). To measure
the SWR on the random feedline requires an SWR meter designed with the same
characteristic impedance, a generator with the same characteristic impedance,
and a break in the middle of the feedline; or if you *know* the characteristic
impedance, you can calculate the SWR from theory (GASP).

This is especially important in the lamp cord case mentioned by the author,
because common lamp cord has REALLY HIGH LOSSES, enough that you don't really
want to use it in the matched condition, much less with 2:1 SWR on it. (Though
the author says that you won't find lamp cord specified in the Handbook, it
turns out that you'll find it discussed in many QST articles over the years;
the impedance is usually 70-100 ohms, unless its different, and the losses
are almost always high (circa 10dB/100', mid HF, from what I remember).)

Regardless of what the SWR on the 50' section is, if the SWR on the feedline is 2:1, that feedline is going to have losses commensurate with 2:1 SWR. (The 50-ohm section between the transmitter and the SWR bridge will have 1:1 SWR, of course, but at 4' it wasn't going to lose a whole lot of signal anyway.)

However, if the feedline is high quality (say, openwire, or perhaps some RG-246 75-ohm hardline you scrounged from a cable company), then you don't *care* what the SWR on that line is (I routinely run over 10:1 on my ladder line and still lose less than an equivalent length of RG-58).

So, it all comes down to what the author promises; if the author says you can take a 3/4-wavelength chunk of zip cord and string it up as a cheap and quick emergency antenna for your fixed-tune rig, then as far as that goes, the author is correct (and is hardly the first to mention this). If the author claims it works *well* because the SWR _on the nondescript feedline_ is 1:1, well, it's bogus.

Another portion of the quoted article gives cause for alarm on that question:

>"You can calculate the velocity factor of any line with nothing
>more than your station equipment using the following procedure
>(use a frequency in the 10 meter band to avoid wasting any more
>of your valuable lamp cord than necessary). [Put 1/2 wavelength
> of lamp cord between meter and 50-ohm dummy load, trim for 1:1
> reading.]

Considering the lossiness of lamp cord, that 1:1 reading will be quite broad, because much of the power will be turning into heat instead of making its way back into the SWR meter's reverse power sensing circuit. It should not change the determined length, however, except by making it difficult to distinguish that last couple of feet worth of trim.

Note, by the way, that 300-ohm TV feedline can be used to make a moderately cheap and moderately quick antenna for fixed-tune rigs, with only a little experimentation needed. 300-ohm twinlead isn't generally low-loss, especially if you get the really cheap stuff at Radio Shack, but it's a lot better than lamp cord. But maybe you *do* want an antenna in 10 minutes, when only the hardware store is open.

Date: 20 Aug 1994 07:31:42 GMT
From: ihnp4.ucsd.edu!dog.ee.lbl.gov!agate!usenet.ins.cwru.edu!news.ysu.edu!yfn.ysu.edu!au156@network.ucsd.edu
Subject: Should feedline length change the VSWR?
To: ham-ant@ucsd.edu

Cecil Moore wrote about exceptions to Walt Maxwell's SWR truths:

>> Truth 22: "SWR in a feed line *cannot* be adjusted
>> or controlled in any practical manner by varying the
>> line length."

CM> Assume a 15m dipole being used on 10m fed with 40 ft of RG-58 and a
CM> transmitter end SWR of 3 causing foldback. Adding 60 ft of RG-58 will
CM> lower the SWR to 1.8 ending the foldback problem and allowing radiation
CM> of 25% of the full transmitter output power.

      This is true; the mild reduction in SWR at the transmitter
      end of the line due of course to the added line attenuation.

>> Truth 23: "... All (SWR) readings
>> are invalid if they change significantly along the line...

CM> Back to Jon Bloom's West Coast transmission line example. 200 ft
CM> of RG-58 on 440 MHz shorted out at the antenna end. SWR is near
CM> infinity at the antenna, SWR is less than 1.1 at the transmitter.
CM> I would say the SWR readings along the line can be valid even though
CM> they change significantly.

      This is also correct; however, not a realistic situation
      employing line of a type and length such that line attenuation
      was that enormous (roughly 30 dB). But a valid illustration
      of what happens when line losses become significant and/or
      dominant.

      If the wording were modified to something like "SWR readings
      are invalid if they vary *up and down* along the line", it
      would speak more specificly to the mistaken notion that this
      rule was intended to address. (That notion being that the
      SWR oscillates, rather than the actual case of steadily
      decreasing travelling in the load-to-source direction.)

I vacillated about whether to add my own qualifying comments or
elaboration to the direct quotes from the 1973 QST series. The
article's context was generally low band operation, particularly
80 meters, where Maxwell notes that folks often must use a shorter
than half-wavelength antenna. The transmission line mumbo-jumbo seems
also to most often crop up in regard to HF antenna systems and not
in VHF/UHF.
....
Hank
h1riley@umassd.edu or au156@yfn.ysu.edu

End of Ham-Ant Digest V94 #272
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